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BEFORE THE

FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON, DC 20554

In the Matter of	)	
	)	
Amendment of Parts 2 and 15	)	
of the Commission's Rules to Permit	)	ET Docket No. 94-124
Use of Radio Frequencies Above 40 GHz	)	RM -8308
for New Radio Applications	)	

To: The Commission

REPLY COMMENTS OF HUGHES AIRCRAFT COMPANY Communications Products Business Unit

Hughes Aircraft Company, Communications Products Business Unit ("HCP") respectfully submits these reply comments in response to the *Notice of Proposed Rule Making* (FCC 94-273, released November 8, 1994) ("*NPRM*") in the above referenced proceeding.

Summary and Introduction

1. HCP is a part of Hughes Aircraft Company that specializes in the development of microwave and millimeter wave subsystems and related components for voice and data communications. HCP's Comments in this Docket emphasized the need to modify some of the proposals in the *NPRM* to fulfil the *NPRM*'s goal of allowing millimeter wave devices to contribute to the National Information Infrastructure (NII) by supporting high speed digital links that will help businesses, government and non-profit institutions connect their buildings together and to the NII.

2. The Comments strongly support HCP's desire to allow wideband point-to-point links with adequate power to allow for reasonable ranges. There is a strong

consensus that the best way to achieve this is to expand the licensed bands to include 54.25-58.2 and 71-74 GHz. This will allow high speed interconnections to the NII at speeds in excess of 1.5 gigabit/second (full duplex) which are sufficient to support Asynchronous Transfer Mode (ATM). Combined with allowing adequate power in the general unlicensed band, these modifications will significantly advance the overall goals of the *NPRM* to allow millimeter wave technology to become an important contributor to improving the productivity of American economy.

Licensed Bands

3. HCP's Comments emphasized the need for modifying the proposals in the *NPRM* to allow wideband point-to-point links. HCP was gratified to note the amount of support from other Commentors about this important goal. Apple Computer emphasized the need for broadband radio links for "community networks" (p. 5). Metricom, pointed out (p. 3f) that the general unlicensed proposal did not provide for wideband links that could cover any significant distance. The Fixed Point-to-Point Communications Section, Network Equipment Division of the Telecommunications Industry Association ("TIA Pt-Pt Section") Comments covered many of the same points that HCP did about the need for better provisions for point-to-point links. Both Alcatel Network Systems and Harris Corporation, Farinon Division supported the TIA Pt-Pt Section's concerns about the need for better accommodation of fixed point-to-point links.

4. A primary concern of HCP was the absence of any wide bandwidth allocations with rules suitable for short and medium distance communications. There is an emerging consensus among the parties that two additional licensed bands should be allocated. These bands are 54.25-58.2 and 71-74 GHz. Both of these bands are allocated both domestically and internationally for Fixed services on a co-primary basis. These bands should be allocated to a Part 21-like service, i.e. one optimized for multiple re-use of point-to-point links by multiple users, rather than for the wide area

service proposed in the *NPRM* for the licensed bands. The 54.25-58.2 GHz band has the additional advantage that this includes the European point-to-point band that American equipment manufacturers are already designing equipment for.[1]

5. Two modifications of the technical rules will promote this use. First, these bands should be reserved for highspeed data links. Other bands including 47.2-50.2 GHz, 38 GHz, and other lower frequencies can be used for lower speed connections. Thus, HCP proposes that 54.25-58.2 and 71-74 GHz be reserved for links whose total bit rate is at least 3 Gigabits per second. This could either be a 3+ Gb/s simplex link or two directional links comprising a full duplex link whose capacity totals 3 Gb/s or higher. Imposing such minimum bit rate will insure that these bands remain available for the high speed links that can only be provided in these two bands.

6. The second modification in the technical rules will be to allow +50 dBW EIRP in order to provide sufficient range, especially at the higher bit rates. Many of the commentors agreed with HCP both about the feasibility and desirability of allowing more power to licensed links. Endgate Technology Corporation (p. 2) recommend that powers of 50-55 dBW EIRP be allowed. Hewlett-Packard ("HP") proposed allowing licensed EIRPs up to +40 dBW (¶15), as did the TIA Pt-Pt Section (p. 16). AT&T suggested +36 dBW (p. 4). Even in the licensed bands reserved for LMDS-like services, increases in EIRP above the proposed +16 dBW will still be useful, especially for the point-to-point links that will interconnect the multiple nodes needed.

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1 These bands are currently allocated to both Government and non-Government. As HCP pointed out in its Comments, there is no reason why a point-to-point band cannot be shared between Government and non-Government users. The TIA Pt-Pt Section makes the valid point that the procedures for coordination between Government and non-Government users will need to be improved, especially the turn around time in which the Government deals with private sector coordination requests (p. 23f).

General Unlicensed Bands

7. The HCP Comment's emphasized the need for additional power in these bands beyond the 0.25 Watt EIRP proposed in the *NPRM*. The need for more power is especially critical for unlicensed devices in the 59-64 GHz band where propagation is subject to absorption by oxygen molecules. HCP proposed that these higher powers be limited to devices that were professionally installed. This would provide the Commission with assurance that the RF exposure limits in the FCC rules would not be exceeded. Many of the commentors agreed with the need for additional power. These included Apple (p. 5), Metricom (p. 4f), HP (¶17), and the Millimeter Wave Advisory Group ("mmWAG").[2]

Technical Issues

8. HCP's Comments raised two technical issues (other than power discoursed above). These were the need to reduce the required suppression of out-of-band signals and the need to reduce the upper limit of required measurements. Epsilon Lambda (p. 3), GM (p. 26ff), American Automobile Manufacturers Association (p. 17), and HP (¶20) all favored reductions in the required suppression of out-of-band emissions from the unreasonable 72 dB below the fundamental EIRP of +16 dBW for licensed and vehicular radar devices.

9. HCP's request to reduce the upper frequency limit on required measurements was supported by Epsilon Lambda which recommended an upper limit of 150 GHz (p. 4), while HP suggested 170 GHz (¶20C). HPC had recommend reducing the 200 GHz proposed in the *NPRM* to 160 GHz.

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2 HCP's Comments (p. 11) raised the possibility of either allowing very high powers (50 dBW EIRP) in the 59-64 GHz general unlicensed band or converting part of that band into an licensed band. In view of the strong support in the Comments for allocating additional wideband licensed bands for point-to-point links (54.25-58.2 & 71-74 GHz), HPC believes this would be, by far, the best approach. Only if the Commission is unable to add these bands to the decision, would HCP recommend considering high powers or splitting the 59-64 GHz band.

Conclusion

10. For the reasons discussed above and in its original comments, HCP urges the Commission to promptly adopt the *NPRM* with the modifications discused above.

Respectfully submitted,

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Certificate of Service

I, Paul J. Fox, hereby certify that on this 1st day of March, 1995, copies of the foregoing "Reply Comments, Hughes Aircraft Company, Communications Products Business Unit " were forwarded by U.S. first class mail, postage prepaid, to the following:

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